REMARKS

The Examiner Thanh T. Nguyen is thanked for carefully examining and reviewing the subject Patent Application. With entry of this response to the Office Action, claims 23 - 27 are now considered to be in condition for allowance.

In a previous office action, the Specification was amended to reflect that: "This application is a Continuation of serial number 09/351,237, filed on July 12, 1999, issued as US Patent 6,207,554, and assigned to a common assignee."

In previous actions, claims 1 - 22 have been canceled by the Applicant, and non-elected claims 28 - 41 have been withdrawn and canceled, reference Applicant's office action response, October 2002.

CLAIMS REJECTIONS - 35 USC 103:

Reconsideration of the rejection of Claims 23, 25 and 27 under 35 U.S.C. 103(a), as being unpatentable over Jeng et al. (U.S. Patent No. 6,114,186) in view of Lucas et al. (U. S. Patent No. 6,287,951), is requested, based on the following.

There are patentable differences between the Prior Art cited and the Applicant's invention, namely the following.

The Applicant's curing conditions are not, as taught by Jeng:

" 300 ^{0}C by a hot plate bake ... ". Jeng (col. 4, lines 39-42)

In contrast, the Applicant's invention teaches the following curing conditions:

"24. The method of claim 23, wherein said low dielectric constant material is spun on dielectric, deposited to a thickness of about 4,000 to 12,000 Angstroms, with curing conditions at 4000C for 1 hr., in a nitrogen ambient gas flow from about 1 to 30 SLM, oxygen less than 10 ppm."

The Applicant's stabilizing material is not, as taught by Jeng:

"by plasmas with a thickness of about 1,000-3,000A" Jeng (col. 4, lines 42-60)

The Applicant's invention teaches the following stabilizing material:

"26. The method of claim 25, wherein said layer of adhesion promoter and stabilizer is silicon nitride, deposited by plasma enhanced chemical vapor deposition to a thickness of between about 200 and 500 Angstroms."

The Applicant's invention teaches a PE CVD specific method claimed and thickness range differs from the prior art, and is the prior art neither teaches nor suggests the Applicant's method.

The Applicant's cap silicon oxide is not:

"cap silicon oxide layer (22) by PECVD with a thickness about 16,000 A".

The Applicant's invention teaches a cap silicon oxide:

"27. The method of claim 23, wherein said silicon oxide cap layer is deposited by plasma enhanced chemical vapor deposition, to a thickness of between about 4,000 to 16,000 Angstroms."

In sharp contrast, Jeng et al. teaches, in Col. 4 line 61, "The cap layer 20 may be followed by a thick, about 16,000 A, SiO_2, interlayer dielectric 22...".

Furthermore, Jeng's teachings has significant differences from that of the Applicant, ref. Jeng, Col. 4 lines 54 and 55, "The thickness of the cap layer is preferably about 1,000 to 3,000 A, and most preferably about 2,000 A."

Lucas et al. (U. S. Patent No. 6,287,951), primarily teaches forming a hardmask and an antireflective layer with silicon nitride, with a totally different application than that taught by the Applicant's Invention. The placement in the process for the "Lucas' nitride", is not to be used as a "stabilizer and adhesion promoter" on low dielectric material, as is taught by the Applicant's invention, thus demonstrating patentable differences.

Reconsideration of the rejection of Claim 24 under 35 U.S.C. 103(a), as being unpatentable over Jeng et al. (U.S. Patent No. 6,114,186) in view of Lucas et al. (U. S. Patent No. 6,287,951), as applied to claims 23, 25, 27, further in view of You et al (U.S Patent No. 6,197,703) is requested, based on the following.

"24. The method of claim 23, wherein said low dielectric constant material is spun on dielectric, deposited to a thickness of about 4,000 to 12,000 Angstroms, with curing conditions at 4000C for 1 hr., in a nitrogen ambient gas flow from about 1 to 30 SLM, oxygen less than 10 ppm." (ref. Applicant's Claim 24)
Agree with the Examiner that Jeng et al. '186 in view of Lucas above, do not specifically show the curing conditions above, as taught by the Applicant's claimed invention.
Furthermore, both Jeng et al. '186 and You et al (U.S Patent No. 6,197,703), neither teach, nor suggest the Applicant's claimed

invention. The above prior art are primarily concerned with processing HSQ material. There exist patentable differences from the Applicant's teaching in the above Claim 24, "low dielectric constant material is spun on dielectric,". The Applicant's Claims do not mention, nor teach an HSQ process or method.

Reconsideration of the rejection of Claim 26 under 35 U.S.C. 103(a), as being unpatentable over Jeng et al. (U.S. Patent No. 6,114,186) in view of Lucas et al. (U. S. Patent No. 6,287,951), as applied to claims 23, 25, 27, further in view of Jeng et al (U.S Patent No. 5,818,111) is requested, based on the following.

A question of obviousness of the Applicant's claimed invention has been raised in connect with the prior art presented by the Examiner, and it is related to the use of nitride as a protection layer over HSQ. The material HSQ is never mentioned neither in the Applicant's Specifications, nor in the Applicant's Claims. Most of the Prior Art cited by the Examiner is concerned with processing HSQ material. There are patentable differences between what is taught by the prior art and what is taught by what the Applicant teaches, in the Applicant's Claims 23 - 27.

In conclusion, for state-of-the-art advanced applications in silicon technology, the applicant's invention is believed to be

patentable over these various references, because there seems to be insufficient basis for concluding that the modification of Prior Art disclosures would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. We believe that there is no such basis for the combination.

SUMMARY OF THE INVENTION

It is the general object of the present invention to provide an improved method of fabricating semiconductor integrated circuit devices, specifically by describing an improved process of fabricating multilevel metal structures using low dielectric constant materials. The present invention relates to an improved processing method for stable and planar intermetal dielectrics, with low dielectric constants. A method is described which utilizes a stabilizing adhesion layer between a bottom, low dielectric constant layer and a top dielectric layer. The advantages are: (i) improved adhesion and stability of the low dielectric layer and the top dielectric oxide, (ii) over all layer thickness of the dielectric layers can be reduced, hence lowering the parasitic capacitance of these layers.

FINAL REMARKS

The Examiner Thanh T. Nguyen is thanked again for carefully examining and reviewing the subject Patent Application. With entry of this response to the Office Action, all claims are now considered to be in condition for allowance.

All rejected claims 23 - 27 are now believed to be in allowable condition, and allowance is so requested.

It is requested that should there be any problems with this response to the Office Action, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,

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